



JOINTVETCH: NATIVE LEGUME IN A NEW ROLE FOR DEER AND CATTLE

Abstract.—In 1963, American jointvetch (*Aeschynomene americana* L.), which is palatable to both deer and cattle, was successfully established on a 10-acre site in south Florida's wet prairies, an area subject to summer flooding and winter drought. Observations over the next 4 years indicated that deer browsed on the legume throughout the summer and fall, particularly in August and September, the period of its peak growth. Annual disking and relatively light fertilization induced a yield of 2 tons (ovendry) per acre the third year after planting.

After the first year, other herbage (about $\frac{1}{2}$ ton per acre) palatable to cattle was produced during the winter when jointvetch had matured. Goobergrass (*Amphicarpum muhlenbergianum*), which could furnish food for cattle in the summer as well as during the winter, increased significantly and produced 1 ton per acre on disked sites during the third year.

INTRODUCTION

American jointvetch (*Aeschynomene americana* L.), an annual legume native to central and southern Florida, is palatable to deer and cattle. Natural distribution of the plant is primarily along roadsides and ditch-banks where grazing has been excluded. Adaptability of this vetch as a forage and cover crop is being appraised by the U.S.D.A. Soil Conservation Service in Florida.

Although adapted to drier sites in the pinelands, jointvetch will grow on extremely wet sites — even in water 12 to 18 inches deep — if it is established prior to inundation. Jointvetch, therefore, should grow well on the wet prairies in south Florida. These prairies, transitional between pinelands and fresh water marshes, are dry during the winter and spring but subject to periodic flooding during the summer rainy season. Patches of jointvetch in the wet prairie would provide animal forage in areas currently of limited value for timber growing, cattle grazing, or wildlife use.

Consequently, the opportunities for introducing jointvetch to the wet prairie were of interest to the Forest Service project on Integrated Cattle-Timber-Wildlife Research.

A study¹ was initiated in 1963 in Charlotte County, Florida, to appraise the following:

1. The adaptability of American jointvetch to a wet prairie under limited management
2. Its utilization by deer in an area where the deer population was relatively low
3. The opportunities for dual use of jointvetch and native grasses by deer and cattle.

Observations over 4 years, 1963-1966, are reported.

¹A cooperative study conducted by the Forest Service, the Soil Conservation Service, and the Babcock Florida Company.

ESTABLISHMENT

A 10-acre site of Pompano fine sand was double disked; 4-12-12 fertilizer was applied at the rate of 300 pounds per acre; jointvetch seeds were broadcast at the rate of 10 pounds per acre; and the site was disked lightly by May 20, 1963. The area was fenced in order to exclude cattle but permit access by deer. Ten wire cages, each of sufficient size to accommodate a circular plot containing 9.6 square feet, were installed. An 8-foot-wide strip around the study area was disked periodically to serve as a fire barrier and as a track-count plot for estimates of deer population.

Precipitation was above average in May, when almost 9 inches fell, but about average for the year. The study area was flooded by the heavy rainfall in May and several times thereafter during the summer.

A large portion of the seed germinated the last week in May. By mid-June, the number of jointvetch plants averaged 2 per square foot, varying from none on the frequently flooded areas to 9 per square foot on drier areas. Because of considerable variation in the stand the first year, production was not estimated; but records were kept of growth habits of vetch and track counts of deer entering the study area overnight.

Young plants were utilized heavily by deer throughout the summer. In fact, almost all available vetch materials were removed. Track counts indicated overnight entries varied from 20 to 34 during the summer, with the peak occurring during late August.

The plants developed a prostrate habit of growth as a result of continuous removal of upright shoots by deer during July and early August. However, growth accelerated in late August. By early October, the diameters of the prostrate plants ranged to 9 feet; and many vertical stems had developed.

The uncaged plants had multiple branches, while caged plants had the typical single stems; thus, more grazeable tips of jointvetch were probably produced on the grazed areas than in the cages. Deer entries decreased throughout September and October. By December, only an occasional deer made use of the site.

Although a few seeds were produced as early as September 25, most plants began blooming in late September and early October. The primary seed-production period came in the late fall after the period of most intensive deer use. Most of the stand died by December, but a few heavily browsed plants lived into the spring of 1964. These plants continued to bear some seed; consequently, an excellent seed crop was produced, despite heavy browsing the previous year.

THE SECOND YEAR

Seed germination began about March 1, 1964, somewhat earlier than anticipated. A heavy rainfall (5.8 inches) in February provided an adequate amount of surface soil moisture for the early germination. Precipitation throughout the remainder of the year was below average. The total for 1964 was 41.9 inches, as compared to the average of about 53 inches. The water table was at or near the soil surface frequently during the summer, but flooding was less frequent and of shorter duration in 1964 than in 1963.

The site was fertilized with 4-12-12 (300 pounds per acre) and disked lightly on March 12. On April 13, jointvetch plants appeared on each of the ten caged plots, ranging in density from 0.5 to 25.2 per square foot and averaging 8.3 per square foot.

The amount and season of deer use in 1964 was similar to the pattern in 1963. For example, overnight visits averaged 25 in August 1963 and 22 in August 1964. On December 18, 1964, only two entries were noted. Jointvetch production averaged 1,251 pounds per acre (table 1), most of which was utilized by deer.

A number of native plants other than *Aeschynomene* grew on the site the second year. Production of other herbage totaled 2,906 pounds per acre by November 1. Goosgrass (*Amphicarpum muhlenbergianum*), carpetgrass (*Axonopus affinis*), and yellowsedge bluestem (*Andropogon virginicus*) composed 38 percent of total production (table 2). Cattle from surrounding ranges were allowed access to the study area in mid-December in order to utilize this forage and to reduce competition with jointvetch the following spring. The cattle were removed on March 1 prior to start of vetch germination.

Table 1. -- Fall yields of jointvetch and other herbage, 1964-1966

Species	Year and site treatment						
	1964	1965			1966		
	Disked	Disked	Undisked	Average	Disked	Undisked	Average
----- Pounds per acre (ovendry) -----							
Jointvetch	1,251	4,248	2,759	3,504	1,316	1,062	1,189
Other	2,906	1,863	2,324	2,094	2,576	3,160	2,868
Total	4,157	6,111	5,083	5,598	3,892	4,222	4,057

Table 2. -- Fall composition of herbage other than jointvetch, 1964 to 1966

Species	Year and site treatment				
	1964	1965		1966	
	Disked	Disked	Undisked	Disked	Undisked
----- Percent of total dry weight -----					
<i>Amphicarpum muhlenbergianum</i> (Schult.) Hitchc.	17	97	40	32	27
<i>Paspalum distichum</i> L.	24	0	16	0	0
<i>Axonopus affinis</i> Chase	14	0	6	13	7
<i>Paspalum notatum</i> Flugge	0	0	10	1	18
<i>Pluchea foetida</i> (L.) D. C.	11	0	0	2	0
<i>Andropogon virginicus</i> L.	7	1	6	3	3
<i>Panicum tenerum</i> Beyr.	5	0	0	0	0
<i>Eragrostis chariis</i> (Schult.) Hitchc.	2	1	17	0	1
<i>Centella erecta</i> (L.f.) Fern.	2	1	0	9	4
<i>Paspalum</i> sp.	0	0	0	10	0
<i>Axonopus furcatus</i> (Flugge) Hitchc.	0	0	2	0	9
Other	18	0	3	30*	31*
Total	100	100	100	100	100

* Most of these were forbs of less importance to deer or cattle.

On March 8, the caged plots contained the equivalent of 954 pounds of ovendry forage per acre. The cattle utilized all production outside the cages and trampled down most of the rough from the previous growing season.

THE THIRD YEAR

During March 1965, one-half of the site was disked, and the entire area was fertilized with 4-12-12 at the rate of 300 pounds per acre. Although no vetch seed had germinated by March 1, by March 24 an average of 1.3 plants had emerged per square foot. Almost 5

inches of rain fell in March (3 inches more than the March average); otherwise, the distribution of rainfall for 1965 was about average.

Aeschynomene bloomed profusely in late September, producing much seed; and the plants were dead by December 2. In the fall, the stand was 49 inches tall, as compared to 43 inches in 1964; and the number of stems per square foot increased from 6 to 16.

The average yield of jointvetch in 1965 was 3,504 pounds (ovendry) per acre, almost three times as much as the 1964 yield (table

1). Disking significantly (95-percent level) affected yields of jointvetch. The yield on the disked plots was 4,248 pounds per acre, as compared to 2,759 pounds per acre on undisked plots.

Deer utilized 48 percent of the total jointvetch production in 1965. Deer use was very high in September and October; during this time the number of overnight entries varied from 96 to 125. Use dropped sharply in November as the vetch matured, and by December only five entries were recorded.

The 1965 yield of herbage other than jointvetch was 2,094 pounds per acre, 28 percent less than the yield in 1964 (table 1). Disking did not significantly affect the yield of other herbage; however, composition was affected. Goobergrass comprised 97 percent of the other herbage on the disked plots and 40 percent on the undisked plots (table 2). This grass was more abundant on both the disked and undisked plots in 1965 than it was the previous year.

Cattle were permitted to graze the study area again from mid-December to mid-March. Caged plots contained 1,166 pounds (oven-dry) herbage per acre when clipped in mid-March. Cattle had used all of this herbage with the exception of an unpalatable *Senecio* which composed 22 percent of the total weight. Goobergrass, which made up 30 percent of the total weight, was the most abundant species in the winter. Previous diskings did not significantly affect the production of total herbage or goobergrass in the winter.

THE FOURTH YEAR

Half of the 10-acre study area was again disked in March 1966, and 300 pounds of 4-12-12 was applied per acre over the entire site. Rainfall was below average during the spring, but was about normal during the remainder of the year.

Jointvetch production dropped to an average of 1,189 pounds per acre (table 1). The stand was 42 inches tall and averaged only 9 stems per square foot. Vetch production was only slightly greater on the disked area.

Deer use also dropped. As usual, highest use occurred in late summer. The greatest number of overnight entries (21) occurred in September. Deer utilized 38 percent of the

1966 vetch yield, but production was down to about one-third of the previous year's yield. The fall yield of herbage other than jointvetch was 2,868 pounds per acre, almost equaling the 1964 production.

Composition did not appear to be greatly affected by site treatment. Disked plots still had a higher composition of goobergrass, but it had dropped sharply to only 32 percent of the total production (table 2). Many new species began to appear and the composition was more variable.

SUMMARY OF OBSERVATIONS

1. American jointvetch is well adapted to Florida's wet prairies, which are subject to summer flooding and winter drought. With annual diskings and relatively light fertilization, a yield of 2 tons (oven-dry) per acre was achieved the third year after planting on a Pompano fine sand; however, the yield dropped to less than 1 ton per acre the fourth year.
2. Peak growth of jointvetch occurred in August and September. Plants bloomed in late September, and stems usually died by early December. Germination of seed occurred in March if soil moisture was adequate.
3. Disking in March significantly increased subsequent yield of jointvetch.
4. Young plants and tender tips and leaves of older vetch were very palatable to deer. Deer use was greatest in the summer and declined as the vetch matured in the fall.
5. Heavy browsing during the year of establishment caused the vetch to develop a prostrate growth habit. Late in the growing season, numerous upright stems developed — in contrast to the usual growth of a single stem per plant. Many of the heavily browsed plants lived through the winter.
6. After the first year, about ½ ton (oven-dry) of other herbage was produced per acre during the winter period after jointvetch matured (December to March). This herbage probably utilized nitrogen fixed by the vetch, and cattle found it very palatable. Use of this forage by cattle probably paid the cost of reestablishing the vetch.

7. Goobergrass, a native forage grass, increased significantly over a 3-year period. Disking accelerated the increase; and 1 ton of goobergrass was produced per acre during the summer of the third year.
8. The fourth year's production of jointvetch and goobergrass dropped sharply. Production of other herbage increased and several new species appeared, many of which were of less importance to deer or cattle.
9. Further study is needed to determine whether this grass can be maintained in combination with jointvetch for possible dual use by deer and cattle in the summer-fall period. Supplemental grazing of jointvetch by cattle in areas where deer use is light might delay the maturity of vetch into the late fall and early winter. This delay would provide additional winter forage for deer. Such grazing schedules for optimum use of jointvetch have not yet been determined.

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